

V. *Remarks upon the Solar and the Lunar Years, the Cycle of 19 Years, commonly called the Golden Number, the Epact, and a Method of finding the Time of Easter, as it is now observed in most Parts of Europe. Being Part of a Letter from the Right Honourable George Earl of Macclesfield to Martin Folkes, Esq; President of the Royal Society.*

Of the Solar Year.

Read May 10. 1750. **T**HE mean *Tropical Solar Year*, or that mean Space of Time wherein the Sun, or Earth, after departing from any Point of the Ecliptic, returns to the same again, consists, according to Dr. *Halley's* Tables, of $365^d, 5^h, 48', 55''$: Which is less by $11', 5''$, than the mean *Julian* Year, consisting of $365^d, 6^h, 0', 0''$.

Hence the Equinoxes and Solstices anticipate, or come earlier than the *Julian* Account supposes them to do by $11', 5''$, in each mean *Julian* Year; or $44', 20''$ in every four; or $3^d, 1^h, 53', 20''$, in every four hundred *Julian* Years.

In order to correct this Error in the *Julian* Year, the Authors of the *Gregorian* Method of regulating the Year, when they reformed the Calendar in the Beginning of *October* 1582, directed that three intercalary Days should be omitted or dropped in every four hundred Years; by reckoning all those Years,
whose

whose Date consists of a Number of entire Hundreds not divisible by 4, such as 1700, 1800, 1900, 2100, &c. to be only Common, and not Bissextile or Leap Years, as they would otherwise have been; and consequently omitting the intercalary Days, which, according to the *Julian Account*, should have been inserted in the Month of *February* in those Years. But at the same time they order'd that every fourth hundredth Year, consisting of a Number of entire Hundreds, divisible by 4, such as 1600, 2000, 2400, 2800, &c. should still be considered as Bissextile or Leap Years, and, of consequence, that one Day should be intercalated as usual in those Years.

This Correction, however, did not entirely remove the Error: For the Equinoxes and Solstices still anticipate 1^h , $53'$, $20''$ in every four hundred *Gregorian* Years.

But that Difference is so inconsiderable as not to amount to twenty-four Hours, or to one whole Day, in less than 5082 *Gregorian* Years.

Of the Lunar Year, Cycle of 19 Years, and the Epact.

The Space of Time betwixt one mean Conjunction of the Moon with the Sun and the next following, or a mean *Synodical Month*, is equal to 29^d , 12^h , $44'$, $3''$, $2'''$, 56^{iv} , according to Mr. *Pound's* Tables of mean Conjunctions.

The Common Lunar Year consists of 12 such Months.

The

The Intercalary or *Embolimæan* Year consists of 13 such Months.

In each Cycle of 19 Lunar Years, there are 12 Common, and 7 Intercalary or *Embolimæan* Years, making together 235 Synodical Months.

It was thought, at the time of the General Council of *Nice*, which was holden in the Year of our Lord 325, that 19 *Julian* Solar Years were exactly equal to such a Cycle of 19 Lunar Years, or to 235 Synodical Months; and therefore, that, at the End of 19 Years, the New Moons or Conjunctions would happen exactly at the same Times, as they did 19 Years before: And upon this Supposition it was, that, some time afterwards, the several Numbers of that Cycle, commonly called the Golden Numbers, were prefixed to all those Days in the Calendar, on which the New Moons then happened in the respective Years corresponding to those Numbers; it being imagined, that whensoever any of those Numbers should for the future be the Golden Number of the Year, the New Moons would invariably happen on those Days in the several Months, to which that Number was prefixed.

But this was a Mistake:

		d	h	'	"	'''
For 19 <i>Julian</i> Solar Years contain	6939, 18, 0, 0, 0					
Whereas 235 Synodical Months	} 6939, 16, 31, 56, 30					
contain only						
And are therefore less than 19	} 0, 1, 28, 3, 30.					
<i>Julian</i> Solar Years by						

This Difference amounts to a whole Day very nearly in 310.7 Years, the New Moons anticipating,

H h h

or

or falling earlier, by 24 Hours in that Space of Time, than they did before : And therefore now in the Year 1750, the New Moons happen above four Days and a half sooner, than the Times pointed out by the Golden Numbers in the Calendar.

In order therefore to preserve a sort of regular Correspondence betwixt the Solar and the Lunar Years, and to make the Golden Numbers, prefixed to the Days of the Month, useful for determining the Times of the New Moons, it would be necessary when once those Golden Numbers should have been prefixed to the proper Days, to make them anticipate a Day at the End of every 310.7 Years, as the Moons will actually have done ; that is to set them back one Day, by prefixing each of them to the Day preceding that, against which they before stood.

But as such a Rule would neither be so easily comprehended or retained in Memory, as if the Alteration was to be made at the End or at the Beginning of complete Centuries of Years ; the Rule would be much more fit for Practice, and keep sufficiently near to the Truth, if those Numbers should be set back nine Days in the Space of 2800 Years ; by setting them back one Day, first at the End of 400 Years, and then at the End of every 300 Years for eight times successively : whereby they would be set back, in the whole, nine Days in 2800 Years. After which they must again be set one Day back at the End of 400 Years, and so on, as in the preceding 2800 Years. By which means the Golden Numbers would always point out the mean Times of the New Moons, within a Day of the Truth.

It is plain however that the Lunar Year will have lost one Day more than ordinary, with respect to the Solar Year, whenever the New Moons shall have anticipated a whole Day; as they will have done at those times, when it is necessary that the Golden Numbers should, by the Rule just now given, be set back one Day: and consequently the Epact, for that and the succeeding Years, must exceed by an Unit the several corresponding Epacts of the preceding 19 Years.

For the Epact is the Difference, in whole Days, betwixt the common *Julian* Solar and the Lunar Year; the former being reckoned to consist of 365, and the latter of only 354 Days. If therefore the Solar and the Lunar Year at any time should commence on the same Day, the Solar would, at the End of the Year, have exceeded the Lunar by 11 Days: which Number 11 would be the Epact of the next Year: 22 would be the Epact of the Year following, and 33 the Epact of the Year after that, the Epacts increasing yearly by 11. But as often as this yearly Addition makes the Epact exceed 30, those 30 are rejected as making an intercalary Month, and only the Excess of the Epact above 30 is accounted the true Epact for that Year. Thus when the Epact would amount to 31, 32, 33, 34, &c. the 30 is rejected, and the Epact becomes 1, 2, 3, 4, &c.

Since therefore the Lunar Year will have lost a Day more than ordinary, in respect of the Solar Year, whenever it is necessary to set the Golden Numbers one Day back, as was before observed; it follows, that the Epact must at the same time be increased by an Unit more than usual; the Difference betwixt the Solar and the Lunar Year having been just 10

much greater than usual. That is, 12 must be added, instead of 11, to the Epact of the preceding, in order to form what will be the Epact of the then present Year. Which Addition of an Unit extraordinary to one Epact will occasion all the subsequent Epacts (which will follow each other in the usual manner, each exceeding the foregoing by 11) to be greater by an Unit than their respectively corresponding Epacts of the preceding 19 Years.

If therefore, instead of the Golden Numbers, the Epacts of the several Years were prefixed, in the manner the *Gregorians* have done, to the Days of the Calendar, in order to denote the Days on which the New Moons fall in those Years whereof those Numbers are the Epacts; there would never be Occasion to shift the Places of those Epacts in the Calendar; since the Augmentation by an Unit extraordinary of the Epacts themselves would answer the Purpose, and keep all tolerably right.

Thus in a very easy Method may the Course of the New Moons be pointed out, either by the Golden Numbers, or by the Epacts, according to the *Julian* Account or Manner of adjusting the Year, which goes on regular and uniform without any Variation.

But the regulating these things for those who use the *Gregorian* Account, is an Affair of more Intricacy; and for them it will require more Consideration to determine, when the Epacts are to be more than ordinarily augmented, and at what Times they are to continue in their usual Course; nay, to know when they are not only not to be extraordinarily augmented, but also when they are to be diminished by an Unit, by increasing one of them by 10 only instead of 11 as usual: and this happens much oftener with the
Gregorians,

Gregorians, than the increasing one of them by 12 instead of 11. For, in every *Gregorian* Solar Year, whose Date consists of any Number of entire Hundreds not divisible by 4, it is supposed that the Equinox has anticipated one whole Day; and therefore one Day, that which ought to be the intercalary one, is omitted; and consequently the preceding Solar Year, where one Day was lost, exceeded the Lunar Year by 10 Days only instead of 11.

In order therefore to adapt the before-mention'd Rule to the *Gregorian* Account, and to know in what Years the Epacts should either be extraordinarily augmented or diminished, and the Golden Numbers should either be set backwards or forwards in the Calendar; the following Rules and Directions must be observed.

First. That in the Years 1800, 2100, 2700, 3000, &c. where the Number of entire Hundreds is divisible by 3, but not by 4, the *Gregorian* Solar, as well as the Lunar Year, will have lost a Day; and consequently the Difference betwixt them will be the same as usual: Therefore in those Years there must be no Alteration, either in the Epacts or the Golden Numbers; but the former must go on in the same manner, and the latter stand prefixed to the same Days in the Calendar, for another, as they did for the last hundred Years.

2dly. The like will happen in the Years 2000, 2800, 3200, &c. where the Number of entire Hundreds is divisible by 4, but not by 3: For neither the *Gregorian* Solar nor the Lunar Year is to be altered; and therefore the Epacts must go on, and the Golden Numbers stand, as they did before.

But,

But, 3dly, In the Years 2400, and 3600, whose Number of entire Hundreds is divisible both by 3 and 4, the *Gregorian* Solar Year goes on as usual, and the Lunar Year has lost a Day. The Difference therefore betwixt them being 12, the Epact of the preceding Year must be augmented by that Number instead of 11, in order to form the Epact of the then present Year; whereby a new Set of Epacts will be introduced, exceeding their precedent corresponding Epacts by an Unit: And the Golden Numbers must be set one Day back in the Calendar.

4thly and lastly, In the Years 1900, 2200, 2300, 2500, &c. where the Number of Hundreds is divisible neither by 3 nor 4; the *Gregorian* Solar Year having lost one Day, and the Lunar none, the Difference betwixt them being only 10; that Number only and not 11, is to be added to the Epact of the preceding, in order to form the Epact of that, the then present Year; whereby a new Set of Epacts will be introduced, all of them less by an Unit than their precedent corresponding Epacts: And the Golden Numbers must be set a Day forwarder in the Calendar; that is, be prefixed to the Day following that, against which they stood in the precedent hundred Years.

This Method would preserve a sort of Regularity betwixt the Solar and the Lunar Years and, by means of the Rules and Directions before-mentioned, the Days of the New Moons might be pointed out, either by the Golden Numbers or by the Epacts, placed in the Calendar for that Purpose; according to the *Julian* Account for ever, and according to the *Gregorian* Account till the Year 4199 inclusive, after which

which there must be some little Variation made in the four last Precepts or Rules; but it would be to little Purpose now, to attempt the framing of a new Set of Rules for so distant a Time.

The *Gregorians* have chosen to make use of the Epacts to determine the Days of the New Moons, and follow pretty nearly the Rules prescribed above; except that they order the Epacts to have an additional Augmentation of an Unit eight times in 2500 Years, beginning with the Year 1800, as at the End of 400 Years; to which 400 Years if there be added three times seven hundred, or 2100 Years, the Period of 2500 Years will be completed in the Year 3900. After which they do not make their extraordinary Augmentation of an Unit in the Epacts, till at the End of another Term of 400 Years; which defers that Augmentation from the Year 4200 to the Year 4300. And this is the Reason that the Rules above deliver'd will require a Variation in the Year 4200; whereas it is directed in this Paper that the Epacts should be augmented, or (which is the same thing) the Golden Numbers be set back in the Calendar nine times in 2800 Years. This arises from the *Gregorians* supposing, that the Difference betwixt 19 Solar and as many Lunar Years would not amount to a whole Day in less than 312 Years and a half; whereas it has appeared above, that it would amount to a whole Day in 310.7 Years. But although the Rule prescribed in this Paper comes much nearer to the Truth, yet the Error in either Case is very inconsiderable, being so small as not to amount to a whole Day in many thousand Years; and therefore is not worth regarding.

A Method of finding the Time of Easter, as it is observed in most Parts of Europe.

From what has been already said, a Method may be obtained, for fixing, with sufficient Exactness, the Time of the Celebration of the Feast of *Easter*, which is governed by the *Vernal Equinox*, and by the Age of the Moon nearest to it. The former whereof, when once rightly adjusted, may (by the Corrections mentioned in that Part of this Paper which relates to the Solar Year) be made to continue to fall at very near the same time with, or at most not to differ a whole Day from the true *Equinox*: and the same Rules and Directions, which, as was before shewn, would, without any great Error, point out the Times of the first Day of the Moon, would with equal Certainty point out the fourteenth, fifteenth, or any other: And thus the Times of the Oppositions or the Full Moons might be as well marked out thereby, as those of the Conjunctions or the New Moons.

I shall not at present take notice of the Canon of the Council of *Nice*, in the Year of our Lord 325, which directs the Time of celebrating the Feast of *Easter*, or of the Reasons upon which that Canon was founded. Nor shall I endeavour to explain the Rule now in Use in the Church of *England* for finding *Easter*: For, besides that such an Explanation would extend this Paper to an improper Length, those Points have already been treated of by several much abler Hands, and particularly by our Conntryman the learned Dr. *Prideaux*. Nor is it my Intention to enter far into the

the

the Methods used by the *Gregorians*, or those of the Church of *Rome*, or by any other Nations or Countries, for finding the Time of that Feast. As to our own, I shall only observe, that the Method now used in *England*, for finding the fourteenth Day of the Moon, or the Ecclesiastical Full Moon, on which *Easter* dependeth, is, by Process of Time, become considerably erroneous : as the Golden Numbers, which were placed in the Calendar, to point out the Days on which the New Moons fall in those Years of which they are respectively the Golden Numbers, do now stand several Days later in the same than those New Moons do really happen. Which Error, as was before observed, arises from the Anticipation of the Moons since the Time of the Council of *Nice* : And as the *Vernal Equinox* has also anticipated eleven Days since that time ; neither that Equinox, nor the New Moons, do now happen on those Days upon which the Church of *England* supposes them so to happen.

When Pope *Gregory XIII.* reformed the *Julian* Solar Year, he likewise made a Correction as to the Time of celebrating the Feast of *Easter*, by placing the Epacts (which he directed to be made use of for the future instead of the Golden Numbers) much nearer to the true Times of the New Moons than the Golden Numbers then stood in the old Calendar : I say, *much nearer to the true Times* ; because in fact the Epacts, as placed by him, were not prefixed to the exact Days upon which the New Moons then truly fell. And this was done with Design, and for a Reason which it is not material to the Purpose of this Paper to mention.

But the Church of *England*, and that of *Rome* or the *Gregorians*, do still agree in this; that both of them mark (the former by the Golden Numbers, and the latter by the Epacts corresponding to them) the Days on which their Ecclesiastical New Moons are supposed to happen: And that fourteenth Day of the Moon inclusive, or that Full Moon, which falls upon, or next after, the 21st Day of *March*, is the Paschal Limit or Full Moon to both: And the *Sunday* next following that Limit or Full Moon, is by both Churches celebrated as *Easter Day*. But the 21st of *March* being reckoned, according to the *Gregorian* Account or the New Style, eleven Days sooner than by the *Julian* Account or the Old Style, which is still in Use among us; and their Ecclesiastical New Moons being three Days earlier than those of the Church of *England*; it happens that although the Church of *England* and that of *Rome* often do, yet more frequently they do not, celebrate the Feast of *Easter* upon the same natural Day.

It might however be easier for both, and could occasion no Inconvenience, now that Almanacks, which tell the exact Times of the New Moons, are in most Peoples Hands; if all the Golden Numbers and Epacts now prefixed to those Days of the Calendar, in our Book of Common Prayer, and in the *Roman Breviary*, on which the respective Ecclesiastical New Moons happen, were omitted in the Places where they now stand, and were set only against those fourteenth Days of the Moon, or those Full Moons, which happen betwixt the 21st Day of *March* and the 18th of *April*, both inclusive. Since no fourteenth Day or Full Moon, which happens before the 21st

of *March*, or after the 18th Day of *April*, can have any Share in fixing the Time of *Easter*. By which means the Trouble of counting to the fourteenth Day, and the Mistakes which sometimes arise therefrom, would be avoided.

We do as yet in *England* follow the *Julian* Account or the Old Style in the Civil Year; as also the Old Method of finding those Moons upon which *Easter* depends: Both of which have been shewn to be very erroneous.

If therefore this Nation should ever judge it proper to correct the Civil Year, and to make it conformable to that of the *Gregorians*, it would surely be adviseable to correct the Time of the Celebration of the Feast of *Easter* likewise, and to bring it to the same Day upon which it is kept and solemnized by the Inhabitants of the greatest Part of *Europe*, that is, by those who follow the *Gregorian* Account. For tho' I am aware, that their Method of finding the Time of *Easter* is not quite exact, but is liable to some Errors; yet I apprehend, that all other practicable Methods of doing it would be so too: And if they were more free from Error, they would probably be more intricate, and harder to be understood by Numbers of People, than the Method of determining that Feast either by a Cycle of Epacts, as is practised by the *Gregorians*, or by that of 19 Years or the Golden Numbers, in the manner proposed in the following Part of this Paper: And it is of no small Importance, that a Matter of so general a Concern, as the Method of finding *Easter* is, should be within the Reach of the Generality of Mankind, at least as far as the Nature of the thing will admit.

For which Reason, in case the Legislature of this Country should before the Year 1900, think fit to make our Civil Year correspond with that of the *Gregorians*, and also to celebrate all the future Feasts of *Easter* upon the same Days upon which they celebrate them; this last Particular might be easily effected, without altering the Rule of the Church of *England* for the finding of that Feast: And this only by advancing the Golden Numbers, prefixed to certain Days in the Calendar, 8 Days forwarder for the New Moons, or 21 Days forwarder for the fourteenth Days or Full Moons, than they now stand in our Calendar.

In order to explain this, it must be observed, that the *Gregorian* Account or the New Style is eleven Days forwarder than the *Julian* Account or the Old Style, which we still make use of; that is, the last Day of any of our Months is the eleventh Day of their next succeeding Month. If therefore their Ecclesiastical New Moons fell on the same Days with those of the Church of *England*, the Golden Number 14, which now stands against the last Day of *February* in our that is the *Julian* Calendar, should, when we should have adopted the *Gregorian* Calendar, be prefixed to the 11th Day of *March*. But since their Ecclesiastical New Moons happen 3 Days earlier than our Ecclesiastical New Moons at present do; so much should be deducted from those 11 Days, by which the Golden Numbers ought otherwise to be advanced; and the Golden Number 14 should not be placed against the 11th, but the 8th Day of *March*: Which being reckoned the first Day of the Moon, if we count on to the fourteenth Day of the same inclusive, that would be found to fall on the 21st Day of *March*; on which
Day

Day the *Gregorian* Paschal Limit or Full Moon will happen when the Golden Number is 14. And the like Course should be taken with the rest of the 19 Golden Numbers; which ought to be placed 8 Days forwarder than they now stand, if they are to point out the New Moon; or 21 Days forwarder than they are at present, if they are to mark the fourteenth Day of the Moon or the Full Moon: The latter of which, as has been shewn, would be more eligible, than to prefix those Numbers to the Days on which the New Moons happen.

Thus may the Rule and Method now used in the Church of *England*, be most easily adapted to shew the Time of *Easter*, as it is observed by the *Gregorians*, till the Year 1900; at which Time, and at the other proper succeeding Times, if the Golden Numbers in the Calendar shall either be advanced or set backward a Day, according to the foregoing Rules and Directions for that Purpose, they will continue to shew us the New or the Full Moons of the Church of *Rome* or the *Gregorian* Calendar with great Exactness, till the Year 4199: when, as has been already mentioned, there must be a little Variation made in those Rules and Directions.

There is however one Exception to those General Rules and Directions, which will be taken notice of in the next Paragraph.

Upon these Principles I framed the Table accompanying this Paper, and shewing, by means of the Golden Numbers, all the *Gregorian* Paschal Limits or Full Moons, from the Reformation of the Calendar, &c. by Pope *Gregory* to the Year 4199 inclusive. Which Space of Time is therein divided into sixteen unequal Portions or Periods; at the Beginning of

each of which, all the Golden Numbers, when once they shall have been properly placed in the Calendar, must either be advanced or set back one Day, with respect to the Place where they stood in the preceding Period, agreeably to the foregoing Rules: Except those Numbers which shall happen to stand against the 4th and 5th of *April* to shew the Paschal New Moons, or against the 17th and 18th of the same Month to mark out the Paschal Full Moons; both which Numbers at some Times, and only one of them at others, must keep the same Place for that, which was allotted to them in the immediately preceding Period.

In order to determine at what Times, and on what Occasions, this Exception is to take Place; let it be observed, that, in the Months of *January*, *March*, *May*, and some others in our present Calendar, as well as in the Table above-mentioned, some of the Golden Numbers stand double or in Pairs, and follow one the other immediately; whilst others, on the contrary, generally stand single and by themselves.

Now, when any of those Pairs, or two Numbers which usually accompany each other, happen, in pursuance of the foregoing Rules, to be prefixed the one to the 4th and the other to the 5th of *April* for the New Moons, or the one to the 17th and the other to the 18th of *April* for the Paschal Limits or Full Moons: And when any of those Numbers, which generally stand single, are prefixed, according to the said Rules, to the 5th of *April* for the New Moons, or to the 18th for the Full Moons: In these Cases those Pairs or single Numbers that are so situated, must not be set forward or advanced at the Beginning

ning of the next Period, but must keep their Places during another Period, if the foregoing Rules direct all the Golden Numbers to be advanced a Day ; which must be complied with in respect to all the other Golden Numbers, except those so situated as above. Instances whereof may be seen in the Table, under the respective Periods beginning with the Years 1900, 2600, 3100, and 3800.

But if, in Conformity to the foregoing Rules, all the Golden Numbers are to be set one Day backward ; those Pairs or single Numbers, tho' situated as is above-mentioned, must not keep their Places, but must move one Day backward like all the other Golden Numbers ; as they may be seen to do in the Periods beginning with the Years 2400 and 3600.

To give a plain and intelligible Account of the Reason, on which the Directions now given with respect to this Exception are founded, would extend this Paper, already too long, far beyond its due and proper Bounds. I shall therefore content myself with observing, that it depends chiefly upon the Nature of the *Menses Pleni* and *Menses Cavi*, into which the Lunar Year is usually divided : and that, in order to make use of the Golden Numbers for finding the Time of the *Gregorian Easter*, it will be necessary not only to conform to the general Rules laid down in the former Part of this Paper ; but also to follow the Directions just now given, with respect to the above-mentioned Exception to those general Rules.

But I should not do Justice to *Peter Davall*, of the *Middle Temple*, Esq; Secretary of the *Royal Society*,

Society, did I not here acknowledge, that, before I had so fully considered these Matters as I have since done, I had the first Hint of applying the Golden Numbers to find the *Gregorian* Paschal Limit or full Moon, from him ; who has since that time composed and drawn up Tables, &c. which may possibly be of considerable and general Use in this Nation hereafter.

A TABLE, shewing, by means of the Golden Numbers, the several Days Paschal Limits or Full Moons, according to the *Gregorian* Account, have pened, or will hereafter happen; from the Reformation of the Calendar in our Lord 1582, to the Year 4199 inclusive.

To find the Day on which the Paschal Limit or Full Moon falls in any given Year Column of Golden Numbers belonging to that Period of Time wherein the given Year for the Golden Number of that Year; over-against which, in the same Line continued intituled *Paschal Full Moons*, you will find the Day of the Month, on which the Paschal Moon happens in that Year. And the *Sunday* next after that Day is *Easter Day* in the *Gregorian* Account.

Golden Numbers from the Year 1583 to 1699, and so on to 4199, all inclusive

1583 to 1699	1700 to 1899	1900 to 2199	2200 to 2299	2300 to 2399	2400 to 2499	2500 to 2599	2600 to 2899	2900 to 3099	3100 to 3399	3400 to 3499	3500 to 3599	3600 to 3699	3700 to 3799	3800 to 4099	4100 to 4199
3	14	..	6	17	6	17	..	9	..	1	12	1	12	..	4
..	3	14	..	6	..	6	17	..	9	..	1	..	1	12	..
11	..	3	14	..	14	..	6	17	..	9	..	9	..	1	12
..	11	..	3	14	3	14	..	6	17	..	9	..	9	..	1
19	..	11	..	3	..	3	14	..	6	17	..	17	..	9	..
8	19	..	11	..	11	..	3	14	..	6	17	6	17	..	9
..	8	19	..	11	..	11	..	3	14	..	6	..	6	17	..
16	..	8	19	..	19	..	11	..	3	14	..	14	..	6	17
5	16	..	8	19	8	19	..	11	..	3	14	3	14	..	6
..	5	16	..	8	..	8	19	..	11	..	3	..	3	14	..
13	..	5	16	..	16	..	8	19	..	11	..	11	..	3	14
2	13	..	5	16	5	16	..	8	19	..	11	..	11	..	3
..	2	13	..	5	..	5	16	..	8	19	..	19	..	11	..
10	..	2	13	..	13	..	5	16	..	8	19	8	19	..	11
..	10	..	2	13	2	13	..	5	16	..	8	..	8	19	..
18	..	10	..	2	..	2	13	..	5	16	..	16	..	8	19
7	18	..	10	..	10	..	2	13	..	5	16	5	16	..	8
..	7	18	..	10	..	10	..	2	13	..	5	..	5	16	..
15	..	7	18	..	18	..	10	..	2	13	..	13	..	5	16
4	15	..	7	18	7	18	..	10	..	2	13	2	13	..	5
..	4	15	..	7	..	7	18	..	10	..	2	..	2	13	..
12	..	4	15	..	15	..	7	18	..	10	..	10	..	2	13
1	12	..	4	15	4	15	..	7	18	..	10	..	10	..	2
..	1	12	..	4	..	4	15	..	7	18	..	18	..	10	..
9	..	1	12	..	12	..	4	15	..	7	18	7	18	..	10
..	9	..	1	12	1	12	..	4	15	..	7	..	7	18	..
17	..	9	..	1	..	1	12	..	4	15	..	15	..	7	18
6	17	17	9	..	9	..	1	12	12	4	15	4	15	15	7
14	6	6	17	9	17	9	9	1	1	12	4	12	4	4	15

Days on which the
have already hap-
dar in the Year of

n Year; Look, in the
ven Year is contained,
minued to the Column
Pafchal Limit or Full
in that Year, accord-

Inclusive.		Pafchal Full Moons.
00	4100	Days of the Month, and Sunday Letters
0	to	
99	4199	
.	4	March 21. C
2	..	. . 22. D
1	12	. . 23. E
.	1	. . 24. F
9	..	. . 25. G
.	9	. . 26. A
7	..	. . 27. B
6	17	. . 28. C
.	6	. . 29. D
4	..	. . 30. E
3	14	. . 31. F
.	3	April 1. G
1	..	. . 2. A
.	11	. . 3. B
9	..	. . 4. C
8	19	. . 5. D
.	8	. . 6. E
6	..	. . 7. F
5	16	. . 8. G
.	5	. . 9. A
3	..	. . 10. B
2	13	. . 11. C
.	2	. . 12. D
0	..	. . 13. E
.	10	. . 14. F
8	..	. . 15. G
7	18	. . 16. A
5	7	. . 17. B
4	15	. . 18. C
		. . 19. D
		. . 20. E

14	6	6	17	9	17	9	9	1	1	12	4	12	4	4	15
----	---	---	----	---	----	---	---	---	---	----	---	----	---	---	----

Place this in *Philos. Transf.* N. 494, facing p. 434.

4	15	.	.	18. C
		.	.	19. D
		.	.	20. E
		.	.	21. F
		.	.	22. G
		.	.	23. A
		.	.	24. B
		.	.	25. C

A TABLE, shewing, by means of the Golden Numbers, the several Days on which the Paschal Limits or Full Moons, according to the *Gregorian* Account, have already happened, or will hereafter happen; from the Reformation of the Calendar in the Year of our Lord 1582, to the Year 4199 inclusive.

To find the Day on which the Paschal Limit or Full Moon falls in any given Year; Look, in the Column of Golden Numbers belonging to that Period of Time wherein the given Year is contained, for the Golden Number of that Year; over-against which, in the same Line continued to the Column intituled *Paschal Full Moons*, you will find the Day of the Month, on which the Paschal Limit or Full Moon happens in that Year. And the *Sunday* next after that Day is *Easter* Day in that Year, according to the *Gregorian* Account.

Golden Numbers from the Year 1583 to 1699, and so on to 4199, all inclusive.																Paschal Full Moons.
1583 to 1699	1700 to 1899	1900 to 2199	2200 to 2299	2300 to 2399	2400 to 2499	2500 to 2599	2600 to 2899	2900 to 3099	3100 to 3399	3400 to 3499	3500 to 3599	3600 to 3699	3700 to 3799	3800 to 4099	4100 to 4199	Days of the Month, and Sunday Letters
3	14	..	6	17	6	17	..	9	..	1	12	1	12	..	+	March 21. C
..	3	14	..	6	..	6	17	..	9	..	1	..	1	12	..	.. 22. D
11	..	3	14	..	14	..	6	17	..	9	..	9	..	1	12	.. 23. E
..	11	..	3	14	3	14	..	6	17	..	9	..	9	..	1	.. 24. F
19	..	11	..	3	..	3	14	..	6	17	..	17	..	9	..	.. 25. G
8	19	..	11	..	11	..	3	14	..	6	17	6	17	..	9	.. 26. A
..	8	19	..	11	..	11	..	3	14	..	6	..	6	17	..	.. 27. B
16	..	8	19	..	19	..	11	..	3	14	..	14	..	6	17	.. 28. C
5	16	..	8	19	8	19	..	11	..	3	14	3	14	..	6	.. 29. D
..	5	16	..	8	..	8	19	..	11	..	3	..	3	14	..	.. 30. E
13	..	5	16	..	16	..	8	19	..	11	..	11	..	3	14	.. 31. F
2	13	..	5	16	5	16	..	8	19	..	11	..	11	..	3	April 1. G
..	2	13	..	5	..	5	16	..	8	19	..	19	..	11	..	.. 2. A
10	..	2	13	..	13	..	5	16	..	8	19	8	19	..	11	.. 3. B
..	10	..	2	13	2	13	..	5	16	..	8	..	8	19	..	.. 4. C
18	..	10	..	2	..	2	13	..	5	16	..	16	..	8	19	.. 5. D
7	18	..	10	..	10	..	2	13	..	5	16	5	16	..	8	.. 6. E
..	7	18	..	10	..	10	..	2	13	..	5	..	5	16	..	.. 7. F
15	..	7	18	..	18	..	10	..	2	13	..	13	..	5	16	.. 8. G
4	15	..	7	18	7	18	..	10	..	2	13	2	13	..	5	.. 9. A
..	4	15	..	7	..	7	18	..	10	..	2	..	2	13	..	.. 10. B
12	..	4	15	..	15	..	7	18	..	10	..	10	..	2	13	.. 11. C
1	12	..	4	15	4	15	..	7	18	..	10	..	10	..	2	.. 12. D
..	1	12	..	4	..	4	15	..	7	18	..	18	..	10	..	.. 13. E
9	..	1	12	..	12	..	4	15	..	7	18	7	18	..	10	.. 14. F
..	9	..	1	12	1	12	..	4	15	..	7	..	7	18	..	.. 15. G
17	..	9	..	1	..	1	12	..	4	15	..	15	..	7	18	.. 16. A
6	17	17	9	..	9	..	1	12	12	4	15	4	15	15	7	.. 17. B
14	6	6	17	9	17	9	9	1	1	12	4	12	4	4	15	.. 18. C
																.. 19. D
																.. 20. E
																.. 21. F
																.. 22. G
																.. 23. A
																.. 24. B
																.. 25. C